

defects shall be removed from service immediately and repaired:

(1) Portions of the tender frame or body (except wheels) that have less than a 2½ inches clearance from the top of rail;

(2) Tender center sill that is broken, cracked more than 6 inches, or permanently bent or buckled more than 2½ inches in any six foot length;

(3) Tender coupler carrier that is broken or missing;

(4) Tender center plate, any portion of which is missing or broken or that is not properly secured; or

(5) Tender that has a broken side sill, crossbearer, or body bolster.

§ 230.108 Steam locomotive leading and trailing trucks.

(a) *Maintenance.* Trucks shall be maintained in safe and suitable condition for service. Center plates shall fit properly, and the male center plate shall extend into the female center plate not less than ¾ inch. All centering devices shall be properly maintained and shall not permit lost motion in excess of ½ inch.

(b) *Safety chain required.* A suitable safety chain shall be provided at each front corner of all four wheel engine trucks.

(c) *Clearance required.* All parts of trucks shall have sufficient clearance to prevent them from interfering with any other part of the steam locomotive.

§ 230.109 Tender trucks.

(a) *Tender truck frames.* A tender truck frame shall not be broken, or have a crack in a stress area that affects its structural integrity. Tender truck center plates shall be securely fastened, maintained in a safe and suitable condition for service, and provided with a center pin properly secured. The male center plate must extend into the female center plate at least ¾ inch. Shims may be used between truck center plates.

(b) *Tender truck bolsters.* Truck bolsters shall be maintained approximately level.

(c) *Condemning defects for springs or spring rigging.* Springs or spring rigging with any of the following defects shall

be taken out of service immediately and renewed or properly repaired:

(1) An elliptical spring with its top (long) leaf or any other five leaves in the entire spring pack broken;

(2) A broken coil spring or saddle;

(3) A coil spring that is fully compressed;

(4) A broken or cracked equalizer, hanger, bolt, gib or pin;

(5) A broken coil spring saddle; and

(6) A semi-elliptical spring with a top (long) leaf broken or two leaves in the top half broken, or any three leaves in the entire spring broken.

(d) *Tender securing arrangement.* Where equipped, tender devices and/or securing arrangements intended to prevent the truck and tender body from separating in case of derailment shall be maintained in a safe and suitable condition for service.

(e) *Side bearings and truck centering devices.* Where equipped, side bearings and truck centering devices shall be maintained in a safe and suitable condition for service.

(f) *Friction side bearings.* Friction side bearings shall not be run in contact, and shall not be considered to be in contact if there is clearance between them on either side when measured on tangent level track.

(g) *Side bearings.* All rear trucks shall be equipped with side bearings. When the spread of side bearings is 50 inches, their maximum clearance shall be ⅜ inch on each side for rear trucks and ¾ inch on each side for front trucks, where used. When the spread of the side bearings is increased, the maximum clearance shall be increased proportionately.

§ 230.110 Pilots.

(a) *General provisions.* Pilots shall be securely attached, properly braced, and maintained in a safe and suitable condition for service.

(b) *Minimum and maximum clearance.* The minimum clearance of pilot above the rail shall be 3 inches and the maximum clearance shall be 6 inches measured on tangent level track.

§ 230.111 Spring rigging.

(a) *Arrangement of springs and equalizers.* Springs and equalizers shall be

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arranged to ensure the proper distribution of weight to the various wheels of the steam locomotive, maintained approximately level and in a safe and suitable condition for service. Adjusting weights by shifting weights from one pair of wheels to another is permissible.

(b) *Spring or spring rigging condemning defects.* Springs or spring rigging with any of the following defects shall be removed from service immediately and renewed or properly repaired:

- (1) Top leaf broken or two leaves in top half or any three leaves in spring broken. (The long side of a spring to be considered the top.) Broken springs not exceeding these requirements may be repaired by applying clips providing the clips can be made to remain in place;
- (2) Any spring with leaves excessively shifting in the band;
- (3) Broken coil springs; or
- (4) Broken driving box saddle, equalizer, hanger, bolt, or pin.

WHEELS AND TIRES

§ 230.112 **Wheels and tires.**

(a) *Mounting.* Wheels shall be securely mounted on axles. Prick punching or shimming the wheel fit will not be permitted. The diameter of wheels

on the same axle shall not vary more than $\frac{3}{32}$ inch.

(b) *Gage.* Wheels used on standard gage track will be out of gage if the inside gage of flanges, measured on base line is less than 53 inches or more than 53 $\frac{3}{8}$ inches. Wheels used on less than standard gage track will be out of gage if the inside gage of flanges, measured on base line, is less than the relevant track gage less 3 $\frac{1}{2}$ inches or more than the relevant track gage less 3 $\frac{1}{8}$ inches.

(c) *Flange distance variance.* The distance back to back of flanges of wheels mounted on the same axle shall not vary more than $\frac{1}{4}$ inch.

(d) *Tire thickness.* Wheels may not have tires with a minimum thickness less than that indicated in the table in this paragraph (d). When retaining rings are used, measurements of tires to be taken from the outside circumference of the ring, and the minimum thickness of tires may be as much below the limits specified earlier in this paragraph (d) as the tires extend between the retaining rings, provided it does not reduce the thickness of the tire to less than 1 $\frac{1}{8}$ inches from the throat of flange to the counterbore for the retaining rings. The required minimum thickness for tires, by wheel center diameter and weight per axle, is as follows:

Weight per axle (weight on drivers divided by number of pairs of driving wheels)	Diameter of wheel center (inches)	Minimum thickness (inches)
30,000 pounds and under	44 and under	1 $\frac{1}{4}$
	Over 44 to 50	1 $\frac{5}{16}$
	Over 50 to 56	1 $\frac{3}{8}$
	Over 56 to 62	1 $\frac{7}{16}$
	Over 62 to 68	1 $\frac{1}{2}$
	Over 68 to 74	1 $\frac{9}{16}$
	Over 74	1 $\frac{5}{8}$
Over 30,000 to 35,000 pounds	44 and under	1 $\frac{5}{16}$
	Over 44 to 50	1 $\frac{3}{8}$
	Over 50 to 56	1 $\frac{7}{16}$
	Over 56 to 62	1 $\frac{1}{2}$
	Over 62 to 68	1 $\frac{9}{16}$
	Over 68 to 74	1 $\frac{5}{8}$
	Over 74	1 $\frac{11}{16}$
Over 35,000 to 40,000 pounds	44 and under	1 $\frac{3}{8}$
	Over 44 to 50	1 $\frac{7}{16}$
	Over 50 to 56	1 $\frac{1}{2}$
	Over 56 to 62	1 $\frac{9}{16}$
	Over 62 to 68	1 $\frac{5}{8}$
	Over 68 to 74	1 $\frac{11}{16}$
	Over 74	1 $\frac{3}{4}$
Over 40,000 to 45,000 pounds	44 and under	1 $\frac{7}{16}$
	Over 44 to 50	1 $\frac{1}{2}$
	Over 50 to 56	1 $\frac{9}{16}$
	Over 56 to 62	1 $\frac{5}{8}$
	Over 62 to 68	1 $\frac{11}{16}$
	Over 68 to 74	1 $\frac{3}{4}$
	Over 74	1 $\frac{13}{16}$